University of Connecticut Health Center

TESTIMONY

Commerce Committee

March 4, 2008

SB No. 551 AN ACT CONCERNING FUNDING FOR AN EMINENT FACULTY RESEARCH TEAM AND NANOTECHNOLOGY

Senator LeBeau, Representative Berger, members of the Commerce Committee, thank you for providing me the opportunity to provide written testimony **in support of SB 551 An Act Concerning Nanotechnology.** My name is Leslie M. Loew, Director of the R. D. Berlin Center for Cell Analysis and Modeling (CCAM), Professor of Cell Biology and Boehringer-Ingelheim Chair in Cell Science at the University of Connecticut Health Center. I urge your support of the SB 551.

Nanomedicine is a field of nanotechnology that aims to develop highly specific medical intervention at the molecular scale for curing disease or repairing damaged tissues such as bone, muscle or nerve. Research in nanomedicine could lead to treatments at the cellular level. One example that is very exciting is that with this new science we might be able to encapsulate and isolate a protein that is causing damage inside a cell within the body, without killing the part of the cell that is considered healthy.

Almost all cellular processes use molecular assemblies that are smaller than 100 nanometers, too small to be seen with a conventional lab microscope. The first step in realizing the potential of nanomedicine will be to elucidate the mechanisms by which this nano-machinery operates. Ultimately, this knowledge can lead to the design of biological nano-devices that could have applicability not just in medicine, but also in a broad range of engineering fields. Nanomedicine is one of the focus areas of the NIH "Roadmap for Biomedical Research" (http://nihroadmap.nih.gov/nanomedicine/index.asp) and, independently, of the National Cancer Institute's research strategic plan (http://nano.cancer.gov/index.asp).

A team centered in the CCAM is working on nanomedicine technologies under a 5 year $12.3M NIH Roadmap award to establish a "National Technology Center for Networks and Pathways". UCHC, through CCAM, has already assembled much of the multidisciplinary team required to gather, as the NIH Roadmap website explains, "extensive information about the physical properties of intracellular structures that will inform us about how biology's molecular machines are built". We are therefore poised to travel along NIH's 10 year Nanomedicine Roadmap, where the basic science groundwork laid by the first 5 years is applied to translational and clinical research initiatives in years 6-10. We are already well positioned to execute the first stage of this plan with:

- An outstanding multidisciplinary faculty including biologists, computational scientists, chemists and physicists. This confluence of diverse fields is extremely unusual in a medical school, but is precisely what is needed to meet the technological challenges of biomedicine in the 21st century.
- An equipment inventory with a value of $11M for high resolution microscope imaging of live biological specimens and computational analysis. This includes an $8M common shared instrument suite that is staffed and maintained as a user facility for both CCAM scientists and the biomedical research community throughout the region.
- The *Virtual Cell*, a modeling and simulation software system and database that manages the complexity of cellular physiology. This publicly available NIH-funded system has over 11,000 registered users around the world.
- A track record of interactions with the pharma and biotech industries. Among the CT companies that use our facilities or have collaborations with our faculty are Pfizer,

Boehringer-Ingelheim, Andor Technology, SibTech, Hepaticus, Scientific Computing Associates and Ciencia.

The primary need for State investment is to leverage these strengths to prepare us for the second stage, where our basic research will be translated to the bedside. The following general areas of recruitment will cement our current strength in Nanomedicine and enable us to realize its ultimate potential. Funding an eminent faculty research team in nanotechnology as referenced in Section 4 of the bill, could assist us greatly in our efforts to recruit faculty in this very specialized area.

- Biophysicists who can harness the existing cellular machinery for the synthesis and targeting of therapeutic agents.
- Computer scientists who can delineate and organize the logic for building proteomic circuits to ultimately engineer a CAD program for designer intracellular nano-devices.
- Biomedical engineers with expertise in micro (nano) fluidics, biosensors and tissue engineering could ultimately design, for example, on-chip single cell biopsies.
- Clinical faculty and fellows who will be directly involved in nanomedicine translational research.

In sum, nanomedicine promises to be an ideal focus for channeling CCAM's unique strengths toward the bedside and toward partnerships with the Connecticut biotechnology industry. Thank you for your attention and again, I ask for your support of SB 551.